

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent)
application of:)

Marc Horna et al.)

In Continuation of International)
Application No. PCT/EP00/07552)

Filed August 3, 2000)

NOZZLE ARRANGEMENT, NOZZLE)
HOLDER AND DEVICE FOR)
EXTRUDING A MATERIAL IN)
DOUGH FORM)

February 5, 2002

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

As a Preliminary Amendment to the above-referenced Application, please enter the following amendments prior to computing the filing fees therefore.

IN THE CLAIMS :

Please cancel claims 1-16 that are presented in the Annexes to the Preliminary Examination Report and insert in lieu thereof the following claims 17-33:

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Signature of person mailing paper or fee

We claim :

17. A nozzle arrangement (12) for extruding doughy substances, comprising
- two inner nozzles (14, 16) for extruding at least one inner substance (26; 98; 112, 114; 168, 170), and
 - two outer nozzles (18, 20) for extruding at least one outer substance (28; 100, 102; 110; 172, 174), wherein
 - the outer nozzles (18, 20) each surround an inner nozzle (14, 16) with clearance, and all of the nozzles (14, 16, 18, 20) are rotatable about a common axis of rotation (148), and
 - the inner nozzles (14, 16) each have a mouth (44, 46) and the outer nozzles (18, 20) each have a mouth (36, 38), characterized in that the mouths (36, 38) of the outer nozzles (18, 20) are disposed in flow direction downstream of the mouths (44, 46) of the inner nozzles (14, 16).
18. The nozzle arrangement according to claim 17, characterized in that the outer nozzles (18, 20) at the level of the mouths (44, 46) of the inner nozzles (14, 16) are narrowed in the direction of flow of the substances.
19. A nozzle carrier (10) for extruding doughy substances, characterized in that it comprises:
- a nozzle arrangement (12) according to claim 17, a stator (60), in which a first (68) and a second feed channel (78) are formed, as well as a rotor (22), which carries the nozzles (14, 16, 18, 20), is rotatably supported in the stator (60) and contains two connection channels (70, 72), which connect the first feed channel (68) in each case to an inner nozzle (14, 16), wherein

between stator (60) and rotor (22) an annular space (76) is formed, which connects the second feed channel (78) to the outer nozzles (18, 20) (Fig. 1).

20. The nozzle carrier according to claim 19, characterized in that the rotor (22) is sealed relative to the stator (60) by means of a first (86) and a second seal (84), wherein the first seal (86) seals off the first feed channel (68) and the first (86) and the second seal (84) seal off the annular space (76).

21. A nozzle carrier (10) for extruding doughy substances, characterized in that it comprises a nozzle arrangement (12) according to claim 17, a stator (60), in which a first (68), second (78) and third feed channel (88) are formed, as well as a rotor (22), which carries the nozzles (14, 16, 18, 20), is rotatably supported in the stator (60) and contains two connection channels (70, 72), which connect the first feed channel (68) in each case to an inner nozzle (14, 16), wherein between the stator (60) and the rotor (22) a first annular space (76) is formed, which connects the second feed channel (78) to a first outer nozzle (18), and a second annular space (90) is formed, which connects the third feed channel (88) to the second outer nozzle (20) (Fig. 4).

22. A nozzle carrier (10) for extruding doughy substances, characterized in that it comprises :
a nozzle arrangement (12) according to claim 17, a stator (60), in which a first (68), second (78) and third feed channel (88) are formed, and a rotor (22), which carries the nozzles (14, 16, 18, 20), is rotatably supported in the stator (60) and contains a first connection channel (70), which connects the first feed channel (68) to the first inner nozzle (14), wherein between the stator (60) and the rotor (22) a first annular space (76) and in the rotor (22) a second connection channel (72) are formed, which connect the second feed channel (78) to the second

inner nozzle (16), and between the stator (60) and the rotor (22) a second annular space (90) is formed, which connects the third feed channel (88) to the outer nozzles (18, 20) (Fig. 7).

23. The nozzle carrier according to claim 21, characterized in that between the rotor (22) and the stator (60) a first (86), second (116) and third seal (84) are disposed, wherein the first seal (86) seals off the first connection channel (70), the first (86) and second seal (116) seal off the first annular space (76), and the second (116) and third seal (84) seal off the second annular space (90).

24. The nozzle carrier according to claim 22, characterized in that between the rotor (22) and the stator (60) a first (86), second (116) and third seal (84) are disposed, wherein the first seal (86) seals off the first connection channel (70), the first (86) and second seal (116) seal off the first annular space (76), and the second (116) and third seal (84) seal off the second annular space (90).

25. A nozzle carrier for extruding doughy substances, characterized in that it comprises :

a nozzle arrangement (12) according to claim 17, a stator (60), in which a first (68), second (78), third (88) and fourth feed channel (176) are formed and a rotor (22), which carries the nozzles (14, 16, 18, 20), is rotatably supported in the stator (60) and contains a first connection channel (72), which connects the first feed channel (68) to the second inner nozzle (16), wherein between the stator (60) and the rotor (22) a first annular space (76) and in the rotor (22) a second connection channel (93) are formed, which connect the second feed channel (78) to a first outer nozzle (18), between the stator (60) and the rotor (22) a second annular space (90) is formed, which connects the third feed channel (88) to the second outer nozzle (20), and between the stator (60) and the rotor (22) a third annular space (186) and in the rotor (22) a

third connection channel (70) are formed, which connect the fourth feed channel (176) to the first inner nozzle (14) (Fig. 20).

26. The nozzle carrier according to claim 25, characterized in that between the rotor (22) and the stator (60) a first (86), second (188), third (116) and fourth seal (84) are disposed, wherein the first seal (86) seals off the first feed channel (68), the first (86) and second seal (188) seal off the third annular space (186), and the second (188) and third seal (116) seal off the first annular space (76), and the third (116) and fourth seal (84) seal off the third annular space (90).

27. The nozzle carrier according to one of claims 19 to 26, characterized in that the axis of rotation (148) of the rotor (22) is the centre line of the nozzles (14, 16, 18, 20).

28. The nozzle carrier according to one of claims 19 to 26, characterized in that at least one of the annular spaces (76, 90) in longitudinal section is in sections circular or elliptical in shape.

29. The nozzle carrier according to one of claims 19 to 26, characterized in that the rotor (22) in the region of at least one annular space (90) is designed (52e) in such a way that, as it rotates, it simultaneously conveys substance contained in the annular space (90).

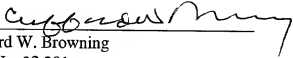
30. The nozzle carrier according to one of claims 19 to 26, characterized in that the rotor (22) in the region of at least one annular space (90) is in cross section of a flattened oval design (52e).

31. A device for extruding doughy substances, characterized in that at least one nozzle carrier (10) according to one of claims 19 to 26 is provided, and the rotor (22) is drivable by means of a traction mechanism gearing, in particular a toothed belt drive (136, 138), or a toothed gearing (136, 152, 154) with intersecting axes (148, 150).

32. Device according to claim 31, characterized in that a plurality of nozzle carriers (10) are disposed side by side and are drivable by means of a single traction mechanism gearing, in particular a toothed belt drive (136, 138), or a single toothed gearing (136, 152, 154) with intersecting axes (148, 150).

33. Device according to claim 32, characterized in that each nozzle carrier (10) is disposed so as to be inclined at an angle α of around 25° to the vertical.

Respectfully submitted,

By: 
Clifford W. Browning
Reg. No. 32,201
Woodard, Emhardt, Naughton,
Moriarty & McNett
Bank One Center/Tower
111 Monument Circle, Suite 3700
Indianapolis, Indiana 46204-5137
(317) 634-3456

#157066

V E R I F I C A T I O N

I, Madgie Vintin, BA., MITI., translator, hereby declare that I am the translator of the documents attached, and certify that the following is a true translation, to the best of my knowledge and belief.

M. Vintin

(translator)

24 January 2002

(date)

Claims

1. Nozzle arrangement (12) for extruding doughy
5 substances, comprising
 - two inner nozzles (14, 16) for extruding at least one inner substance (26; 98; 112, 114; 168, 170), and
 - two outer nozzles (18, 20) for extruding at least one outer substance (28; 100, 102; 110; 172, 174),10 wherein
 - the outer nozzles (18, 20) each surround an inner nozzle (14, 16) with clearance, and all of the nozzles (14, 16, 18, 20) are rotatable about a common axis of rotation (148), and
 - 15 - the inner nozzles (14, 16) each have a mouth (44, 46) and the outer nozzles (18, 20) each have a mouth (36, 38),characterized in that
the mouths (36, 38) of the outer nozzles (18, 20) are
20 disposed in flow direction downstream of the mouths (44, 46) of the inner nozzles (14, 16).
2. Nozzle arrangement according to claim 1,
characterized in that the outer nozzles (18, 20) at
25 the level of the mouths (44, 46) of the inner nozzles (14, 16) are narrowed in the direction of flow of the substances.
3. Nozzle carrier (10) for extruding doughy substances,
30 characterized in that it comprises:
a nozzle arrangement (12) according to claim 1 or 2, a stator (60), in which a first (68) and second feed channel (78) are formed, as well as a rotor (22), which carries the nozzles (14, 16, 18, 20), is

rotatably supported in the stator (60) and contains two connection channels (70, 72), which connect the first feed channel (68) in each case to an inner nozzle (14, 16), wherein between stator (60) and rotor (22) an annular space (76) is formed, which connects the second feed channel (78) to the outer nozzles (18, 20) (Fig. 1).

4. Nozzle carrier according to claim 3, characterized in that the rotor (22) is sealed relative to the stator (60) by means of a first (86) and a second seal (84), wherein the first seal (86) seals off the first feed channel (68) and the first (86) and the second seal (84) seal off the annular space (76).
5. Nozzle carrier (10) for extruding doughy substances, characterized in that it comprises a nozzle arrangement (12) according to claim 1 or 2, a stator (60), in which a first (68), second (78) and third feed channel (88) are formed, as well as a rotor (22), which carries the nozzles (14, 16, 18, 20), is rotatably supported in the stator (60) and contains two connection channels (70, 72), which connect the first feed channel (68) in each case to an inner nozzle (14, 16), wherein between the stator (60) and the rotor (22) a first annular space (76) is formed, which connects the second feed channel (78) to a first outer nozzle (18), and a second annular space (90) is formed, which connects the third feed channel (88) to the second outer nozzle (20) (Fig. 4).

6. Nozzle carrier (10) for extruding doughy substances, characterized in that it comprises:

5 a nozzle arrangement (12) according to claim 1 or 2, a stator (60), in which a first (68), second (78) and third feed channel (88) are formed, and a rotor (22), which carries the nozzles (14, 16, 18, 20), is rotatably supported in the stator (60) and contains a first connection channel (70), which connects the first feed channel (68) to the first inner
10 nozzle (14), wherein between the stator (60) and the rotor (22) a first annular space (76) and in the rotor (22) a second connection channel (72) are formed, which connect the second feed channel (78) to the second inner nozzle (16), and between the
15 stator (60) and the rotor (22) a second annular space (90) is formed, which connects the third feed channel (88) to the outer nozzles (18, 20) (Fig. 7).

7. Nozzle carrier according to one of claims 5 or 6,
20 characterized in that between the rotor (22) and the stator (60) a first (86), second (116) and third seal (84) are disposed, wherein the first seal (86) seals off the first connection channel (70), the first (86) and second seal (116) seal off the first
25 annular space (76), and the second (116) and third seal (84) seal off the second annular space (90).

8. Nozzle carrier for extruding doughy substances, characterized in that it comprises:
30 a nozzle arrangement (12) according to claim 1 or 2, a stator (60), in which a first (68), second (78), third (88) and fourth feed channel (176) are formed, and a rotor (22), which carries the nozzles (14, 16,

18, 20), is rotatably supported in the stator (60) and contains a first connection channel (72), which connects the first feed channel (68) to the second inner nozzle (16), wherein between the stator (60) and the rotor (22) a first annular space (76) and in the rotor (22) a second connection channel (93) are formed, which connect the second feed channel (78) to a first outer nozzle (18), between the stator (60) and the rotor (22) a second annular space (90) is formed, which connects the third feed channel (88) to the second outer nozzle (20), and between the stator (60) and the rotor (22) a third annular space (186) and in the rotor (22) a third connection channel (70) are formed, which connect the fourth feed channel (176) to the first inner nozzle (14) (Fig. 20).

9. Nozzle carrier according to claim 8, characterized in that between the rotor (22) and the stator (60) a first (86), second (188), third (116) and fourth seal (84) are disposed, wherein the first seal (86) seals off the first feed channel (68), the first (86) and second seal (188) seal off the third annular space (186), and the second (188) and third seal (116) seal off the first annular space (76), and the third (116) and fourth seal (84) seal off the third annular space (90).

10. Nozzle carrier according to one of claims 3 to 9, characterized in that the axis of rotation (148) of the rotor (22) is the centre line of the nozzles (14, 16, 18, 20).

11. Nozzle carrier according to one of claims 3 to 10, characterized in that at least one of the annular spaces (76, 90) in longitudinal section is in sections circular or elliptical in shape.

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12. Nozzle carrier according to one of claims 3 to 11, characterized in that the rotor (22) in the region of at least one annular space (90) is designed (52e) in such a way that, as it rotates, it simultaneously conveys substance contained in the annular space (90).

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13. Nozzle carrier according to one of claims 3 to 12, characterized in that the rotor (22) in the region of at least one annular space (90) is in cross section of a flattened oval design (52e).

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14. Device for extruding doughy substances, characterized in that at least one nozzle carrier (10) according to one of claims 3 to 13 is provided, and the rotor (22) is drivable by means of a traction mechanism gearing, in particular a toothed belt drive (136, 138), or a toothed gearing (136, 152, 154) with intersecting axes (148, 150).

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15. Device according to claim 14, characterized in that a plurality of nozzle carriers (10) are disposed side by side and are drivable by means of a single traction mechanism gearing, in particular a toothed belt drive (136, 138), or a single toothed gearing (136, 152, 154) with intersecting axes (148, 150).

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16. Device according to claim 14 or 15,
characterized in that each nozzle carrier (10) is
disposed so as to be inclined at an angle α of around
25° to the vertical.

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